

DIESEL SIP WORKGROUP
SUMMARY OF CONTROL STRATEGIES FOR ON-ROAD SECTOR
(Updated September 13, 2005)

Criteria for evaluating each measure:

- Environmental Benefits
- Technical Feasibility
- Economic Feasibility
- Implementation Feasibility
- Societal Benefits/Env Justice
- Enforceability

DESCRIPTION OF STRATEGY ON-ROAD	PROS	CONS
***Diesel Particulate Filters (DPFs)	Large Particulate Matter (PM) Reduction (>80%)	Requires Duty Cycle Evaluation of the engine to be retrofitted. Would also require the use of backpressure monitors. High equipment and maintenance costs Requires the use of Ultra Low Sulfur Diesel (ULSD). Better suited for diesel engines with horsepower ratings between 175HP and 400HP.
***Diesel Oxidation Catalysts (DOCs)	Minimal maintenance costs (install and forget) Could be fitted to most common diesel engines Much lower unit cost than DPFs	Particulate Matter Reduction less than that of a DPF (approx. 30%). Does not reduce ultrafine particles and in fact, may create them.
**Combined hardware and fuel additives (combustion catalyst)	Increased PM reduction over conventional DOCs and less maintenance and capital costs than that of a DPF.	Dependence on driver's/operator's/owner's memory to add catalyst to fuel system each time diesel vehicle is being fueled. Possible added infrastructure to support the fuel catalyst. Enforcement difficult - how to tell if fuel borne catalyst was added. May have toxic health effects.
**Voluntary retrofits of local delivery trucks or tri-state trucks calling on port using financial incentives from SEPs, EZ Pass tax incentives, etc.	Overall PM reduction throughout several different sectors of the busing/motor truck industry. Federal energy bill includes \$1 billion in grants for states to reduce diesel emissions.	Funding source. Cooperation from local governments and private industry.
*Incentives for early purchase of 2007 Engines, perhaps in combination with a trading program.	90% reduction of PM emissions without the cost and maintenance of retrofit equipment, alternative fuels or fuel borne catalysts. Would avoid potential for stockpiling of pre-2007 vehicles.	High capital cost. Need funding source to offset the increased cost of the 2007 engine.
**Scrappage Programs	Can target Environmental Justice Communities. Can focus on medium duty vehicles which haven't been focus of state programs. Provides venue to install retrofits on the replacement vehicles.	High cost (approx. \$9000 per ton of PM removed). Difficulty in finding source of funding (could use SEPs or fee increases). Is 2/3 offset a sufficient financial incentive?

**Expanding Burlington County Refuse truck LNG program	Approx. 90% reduction in PM. Showcase for alternative/renewable fuel source. Lower fuel costs in the long run. Potential to extract fuel from solid waste “digesters” either from an existing wastewater treatment plant or a remote digester that could be placed in virtually any location.	High initial capital cost to extract and purify LNG from Landfill. Current refueling location is at a landfill but there may be potential to expand to other types of sites. Potential odor problems with the digesters. The “Not in my backyard (NIMBY)” principle associated with locating these digesters.
**Mobile and Stationary Source Credit Trading	Provides incentive to reduce PM emissions from mobile sources which is a largely untapped sector compared to stationary sources. Could require stationary source in non-attainment area to obtain credits in order to comply with new, more stringent permit/emission limits (therefore not an emission increase per se).	Would allow facilities to expand PM emissions from their stationary sources, but could ensure net environmental benefit if some of credits are devalued or offset ratio is greater than 1:1 (E.g. if credited for 20 units of reduction of mobile source emissions, could only increase stationary emissions by 15 units.) EJ representatives concerned regarding localized impact
*Mandatory mobile source reductions in non-attainment areas, otherwise permit denied	Reduction in PM. May already be implemented in Europe	Potential enforcement and implementation problems.
*Purinox® Emulsified Fuel	Approx. 50% reduction in PM.	Need dedicated infrastructure for this fuel. Fuel must be constantly agitated to keep uniform fuel/emulsion mixture. Historically there were problems in colder temperatures. Cost differential high because no blending facility on East Coast. Power loss.
***Create biodiesel corridor (e.g., truck stops along 95)	Renewable source. No engine modifications needed. No Nox increase when used in stationary sources. 10-12% PM reduction. Fuel displacement	Potential for slight increase in Nox still being debated/studied. Biodiesel above 20% (B20) may have storage problems in colder weather. Compatibility with tailpipe retrofits is unknown. May be more expensive than regular diesel therefore no incentive to use.
*E-diesel		Possible safety issues associated with ediesel.
***Driver incentive/training program to reduce idling, coupled with strong enforcement. Target school buses, CDL training, fuel stops, truck stops, placards for visors	Change the conventional thinking that diesel engines have to be constantly idling in order for proper operation. Modern diesel engines with electronic ignition do not require the use of glow plugs; thus idling is not necessary. No cost to driver. Fuel savings through idle reduction and improved driving habits. PM emissions saving through idle reduction. Decreased engine wear.	Adversion to change in the motor transport industry: i.e. “it has always been done that way...” Needs to be implemented long term because always new drivers.
***Publicize the process for reporting excessively smoking vehicles	Low cost.	Difficult to track down the actual vehicle to determine if smoke violates standards (however an informational letter can be sent to vehicle owner at a minimum).
*** Bring roadside opacity checks into the cities instead of only on interstates	Would enable us to target portion of population that is missed by the roadside checks (e.g.,	Would need cooperation of locals. Space constraints on small urban streets.

	local delivery trucks)	
***Expand idling program-enforcement (esp. local police)	Would greatly expand the enforcement of idling laws beyond DEP capabilities.	Local police may not be knowledgeable on the state law, or may conflict with local ordinances.
*Collection of refuse at night.	Would reduce traffic during working hours. Less PM emissions output during working hours.	Excessive noise, especially in suburban and rural areas.
*Halting construction on Ozone Action Days to reduce number of motorists stuck in traffic.	Reduce PM and ozone production for that particular day.	Scheduling delays associated with project, which may have financial consequences.
*Remove all tolls on Ozone Action Days.	Good public support	Small revenue loss. May encourage more people to drive on these days. Implementation may cause confusion among drivers.
*Double cost of tolls on Ozone Action Days	Reduction of number of vehicles on road, thus reduce PM.	Lack of public support and possible enforcement issues (irate motorists)
*Incentive (e.g., waive tire tax) for wide-based tires for high mileage vehicles.	Overall weight reduction of truck of approximately 800-1000 pounds and a 2-5% fuel reduction. Currently predominant in trucks carrying bulk liquids, due to the fact that more product can be transported without weight penalty. Payback is less than 2 years.	For some non-tandem trucks, these tires may not comply with "inch-width" laws in certain states. Truck drivers and fleet managers not familiar with the technology. Not yet widely available. Currently outlawed in Canada. Not universally available if have a flat. High cost to retrofit because need new rims.
*Low viscosity lubricants	Potential for better distribution of lubricant throughout engine thus less engine wear.	Blow-by of lubricant between piston and cylinder wall, increases PM emissions. More expensive
*Highway speed reduction	Possible fuel savings. 50% Nox decrease from 65 to 55 mph. California has dual speed limit of 55 for trucks and 75 for cars.	Very little public support. Trucks operate best in a narrow power band, which is usually above 55mph. Need to enforce otherwise no benefits.
** Tax incentive for automatic tire inflation or monitoring systems	Fuel savings because optimal tire pressure is maintained. Potential safety measure because may reduce severity of blowouts.	Added expense and weight on truck.
**Truck aerodynamic improvements	Built in incentive to purchase because potential for up to 10% in fuel savings. Can target to long haul truckers who will benefit the most.	Applicable to only certain category of truck. Additional expense especially if installed as aftermarket strategy. Enough incentives exist already.
***Hybrid power train technology	10-15% fuel savings. PM emissions savings UPS and FedEx have been experimenting with this technology with good results. Best in "stop and go" applications (short delivery, refuse trucks). Good strategy to target to Env Justice areas. Could require that all fleets purchasing new vehicles must buy a certain percent of hybrids or alternate fuel vehicles (similar to existing state purchase requirement).	Large capital expense. Training of staff mechanics on hybrid engine technology. Currently, no payback even with a 20% fuel savings. This is subject to change given the 2007 engine emissions standards and rising fuel costs.
** Incentive for on board batteries (high powered voltage systems). Batteries power AC/Heating unit and electrical while engine is	Fuel savings through idle reduction. Recent energy bill allows for additional weight (400 lbs.) for trucks to allow for batteries or	Large capital expense. Fleet owners not familiar with technology. Technology not readily available to retrofit existing engines.

off. Batteries get recharged by either the running engine or remote recharger.	Auxiliary Power Units (APUs)	
*** Incentive for Auxiliary Power Units (APUs). A small diesel engine carried on board to power AC/Heat and electrical while main engine is off	Fuel savings through idle reduction. Recent energy bill allows for additional weight for trucks to allow for batteries or Auxiliary Power Units (APUs)	Large capital expense. Fleet owners not familiar with technology.
***Truck Stop Electrification (TSE)	Cost to use system is cheaper than cost of fuel burned while idling so built in incentive for drivers. PM emission reduction through idle reduction.	Large capital expense. Only a few TSE facilities located throughout the country. Driver and fleet owners not yet familiar with the technology.
*Enhanced enforcement of existing speed limit.	PM reduction and fuel savings associated with decreased speed.	Public resistance associated with increased ticketing. Costs associated with increased enforcement.
***Phase out sleeper berth exemption	PM reduction associated with idle reduction of long haul trucks.	Resistance from trucking industry.
**Partnerships with other government agencies such as Dept of Transportation, Dept of Education, Dept of Health. Leverage relationships with outside groups such as school PTAs.	Expand the DEP's public outreach and enforcement capabilities through these partnerships.	Possible resistance from potential partners. An associated cost in government employee's time in generating and maintaining these partnerships.

*** = More promising
 ** = Promising
 * = Less Promising